While no distinct bathymetrical zones, characterized by peculiar forms, can be defined, yet the following table clearly shows that the abundance of fish life decreases with the depth. There have been found between

Fathoms.	Species.
100–300	232
300–500	142
500–700	76
700–1500	56
1500–2000	24
2000–2900	23

While no doubt this decrease in numbers is partly due to the extreme difficulty of investigating the deep-sea fauna, it cannot but be also regarded as pretty certain that, while locally abundant as to individuals, the number of species found is but small.

The descriptions of the new genera and species, though abounding with interesting details in reference to the many strange forms described, cannot with the space at our disposal be even summarized,—they are such as would have been expected from the known skill and judgment of Dr. Günther; but we must find room for some allusion to the Report on the structure of the phosphorescent organs, on the head of Ipnops, by Prof. H. N. Moseley, and on the structure of the phosphorescent organs of fishes, by Dr. R. von Lendenfeld.

In *Ipnops murrayi* the eyes as well as the optic nerves are completely absent, but a pair of symmetrical luminous organs are to be found on either side of the median line of the upper flattened surface of its head, the upper wall of the skull where it covers them being completely transparent.

These phosphorescent organs are composed of hexagonal columnar masses, arranged with considerable regularity in rows, and resting inferiorly on a pigmented connective-tissue layer. Each hexagonal column is composed of a number (from thirty to forty) of transparent rods, disposed side by side at right angles to the outer surface of the organ, and with their bases applied against the concave surface of large hexagonal pigment cells, one of which forms the base of each hexagonal column. The basal pigment cells are also hexagonal in outline, and are cup-like, concavo-convex in form, and of the same breadth as the hexagonal columns. These organs receive a rich blood supply, and there appears little room for doubt but that the nerve supply comes from the fifth nerve. No trace of any other nerve supply has been found. From a comparison of these organs with those of a similar nature in other fish, the author concludes that they are but highly specialized and enormously enlarged representatives of the phosphorescent organs on the heads of such allied Scopelids as *Scopelus rafinesquii* and *S. metopoclampus*.

The Report of Dr. von Lendenfeld is of a more general character, treating as it does of the phosphorescent organs of most of the known phosphorescent fishes, though not alluding to those of Ipnops. These organs are classified into the regular ocellar organs and the irregular glandular organs. Both these classes are again subdivided in reference to their form or position; and in conclusion we have a comparison of the different phosphorescent organs of fishes, and of these as compared with similar organs in other animals.

Dr. von Lendenfeld sums up his investigations as follows:—(1) The phosphorescent organs of fishes are more or less modified glands which have partly been developed from simple slime-glands in the skin, and partly in connection with the slime-canal system; (2) the typical clavate cells are modified gland-cells; (3) the accessory reflectors and sphincters are developed from the skin around and below the gland; (4) the large suborbital organs are innervated by a modified branch of the trigeminus, and the other organs by the ordinary superficial nerves.

A splendid atlas of plates accompanies this volume. Of these, sixty-six represent the new species described by Dr. Günther, and several of them are folding plates; two illustrate the anatomy of the phosphorescent organs of *Ipnops murrayi*; and the remaining five are drawn by Dr. von Lendenfeld and illustrate in a very beautiful manner his Report on the phosphorescent organs just alluded to.

SALINE DEPOSITS.

Die Bildung des Natronsaltpeters aus Mutterlangensalzen. By Dr. Carl Ochsenius. (Stuttgart: E. Koch, 1887.)

THIS book is a very valuable contribution to the history of saline deposits in general, but it is especially useful on account of the author's detailed description of the salt-beds of Chili and Peru, to the study of which he mainly devotes his attention. He discusses the various theories which have from time to time been advanced to account for the formation of Chili saltpetre (sodium nitrate), and shows that it must be regarded as the product of the action of oxidizing guano on certain mother-liquors containing carbonate of soda.

The salt-beds on the west coast of South America are found in the rainless district which stretches from Payta (near Amotape), in Peru, as far south as the twenty-sixth parallel. This region forms a narrow strip along the coast-line, and rarely exceeds twenty-five miles in width. It is bounded on the east by a chain of the Andes, and in the southern portion of the district the coast is fringed with low-lying hills, known as the coast Cordilleras. The author considers that, before the upheaval of the Andes, salt began to deposit in certain bays, which had been wholly or partially shut off from the sea by the gradual formation of an intercepting bar. Then, while the process of evaporation was still incomplete, the district was raised by volcanic action, and the mother-liquors from the salt lakes eventually escaped, running down into the valleys, and, where they encountered no obstacle, reaching the sea. The coast Cordilleras acted as a barrier in the southern portion of the district; while in the northern part the liquors doubtless returned to the sea. The volcanoes which produced the aforesaid upheaval exhaled immense volumes of carbonic acid gas, and the author considers that a portion of the sodium chloride in the mother-liquors was thus converted into sodium carbonate. (The co-existence of borates goes far to confirm the source of carbonic acid.) The coast in this part of Chili is studded with small islands containing deposits of guano

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rich in ammonia. The guano dust is carried by the prevailing west winds far into the country, and would fall into the mother-liquor lakes, where, on exposure to the air at a warm temperature, it would gradually oxidize to nitrate, and, acting on the sodium carbonate, would form sodium nitrate (Chili saltpetre).

The "caliche" (crude saltpetre) is most variable in appearance and in the percentage of nitrate which it contains. The various substances, other than sodium nitrate, which are found in the Tarapaca and Atacama deposits are described at length by the author, who compares them with those which are found at Stassfurt, and he traces in the comparative prominence of the more soluble salts in the Chilian deposits a further confirmation of his theory that the nitre-beds are formed from mother liquor salts.

The book is well indexed, and is supplied with a map and several sections of the district described.

J. I. W.

OUR BOOK SHELF.

Tenerife, and its Six Satellites. By Olivia M. Stone. In Two Vols. (London: Marcus Ward, 1887.)

A GOOD book on the Canary Islands, which have been of so much service to many an invalid, has long been wanted; for, as Mrs. Stone says, many parts even of the best-known islands of Tenerife and Gran Canaria are untrodden ground to English people, and are but little known to persons of any other nationality. Mrs. Stone supplies all the information that can be needed by the most exacting visitor to the islands, or by persons who may wish to read about them at home. As she has already shown in her "Norway in June," she has excellent powers of observation, and knows how to give a clear and effective account of all that she sees in her travels. In the present work her descriptions are all the more vivid because they were written "on the spot," when everything she wished to set down in her narrative was still fresh in her mind. To the Island of Hierro, to which she and her husband seem to have been the first English visitors, she devotes a good deal of attention; and what she has to say about that "solitary, happy, singular" island is full of interest, and would alone have justified her, if justification had been necessary, in making her travels in the Canary Islands the subject of a book. In an appendix she presents a useful epitome of all necessary expenses connected with her tour.

Through Central Asia. By Henry Lansdell, D.D. (London: Sampson Low, 1887.)

THIS is a popular edition of the author's well-known "Russian Central Asia, including Kuldja, Bokhara, Khiva, and Merv." He has omitted many whole chapters and most of the notes, thinking it best that the present edition should consist chiefly of a personal narrative. Any student who may desire fuller information regarding Central Asia is referred to the original work, in which Dr. Lansdell gives 4300 species of fauna and flora in about twenty lists with introductions, adds a bibliography of 700 titles, and treats more or less fully of the geography, economy and administration, ethnology, antiquities, history, meteorology, geology, zoology, and botany of all parts of Russian Turkistan, Kuldja, Bokhara, Khiva, and Turkmenia, down to the frontier of Afghanistan. To the new and abridged edition he has added an appendix on he delimitation of the Russo-Afghan frontier.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*

The Star of Bethlehem.

REFERRING to the hypothesis in your last week's issue, that the star of Bethlehem was Venus, I would point out that 1180 synodical periods of Venus (*i.e.* 1180 × 583·92 = 689,025 mean solar days) take us back from October 28, 1887—when Venus was at her maximum brilliancy as a morning star—to only May 3 of the year 1 A.D. instead of December 25 of the year 1 B.C. For the number of days from October 28, 1887, to December 25, 1 B.C., is 689,155 (viz. 1887 × 365·2425 = 689,213 − 64 + 6 = 689,155). This would appear to show, either that the birth of Christ took place about May 3, or that Venus at her maximum brilliancy as a morning star was not the star of Bethlehem. I should be glad of your remarks on this.

JOHN T. NICOLSON.

20 Thirlestane Road, Edinburgh, December 26, 1887.

I INFER from the article entitled "The Star of Bethlehem" (NATURE, December 22, 1887, p. 169) that the writer supposes the craze he deals with did not exist until Venus became a morning star. It was equally prevalent here when, early in the year, she was an evening star, as the following fact will show. On May 21, 1887, a lady wrote me as follows:—"Will you kindly tell me what people mean about '*a wonderful star*'? All our servants are talking about it. . . . Some call it '*the star of Bethlehem.*' . . . I hear it is '*wonderfully bright!*'"

Torquay, December 26, 1887. WM. PENGELLY.

IN regard to the so-called "star of Bethlehem," Prof. C. A. Grimmer, in "Life from the Dead," No. 69 (August 1879), p. 267, wrote:—"It will be seen in 'Cassiopeia's Chair,' and will be accompanied by a total eclipse of the sun and moon. The marvellous brilliancy of the 'star of Bethlehem' in 1887 will surpass any of its previous visitations. It will be seen even at noonday, shining with a quick flashing light the entire year, after which it will gradually decrease in brightness, and finally disappear." E. COATHAM.

January 2.

On some Apparent Contradictions at the Foundations of Knowledge.

IN Chapter III. of Mr. Herbert Spencer's "First Principles" (p. 47, under heading, "Ultimate Scientific Ideas"), are treated the subjects of space and time. Here contradictions and difficulties of an apparently insuperable character are encountered in the attempt to define the nature of space and time, and the existence of these difficulties is frankly acknowledged. But with all the respect that is here due, it appears difficult to admit that these apparent contradictions are necessary, and in regard to space, in the first place, it will be my object here to suggest a remedy.

I will first quote some passages from the "First Principles" (5th edition) relating to this question, viz. as follows:—

"Thus as space and time cannot either be nonentities, nor the attributes of entities, we have no choice but to consider them as entities. But while on the hypothesis of their objectivity, space and time must be classed as things, we find on experiment that to represent them in thought as things is impossible" (p. 47).

It will be observed here that we encounter the apparent contradiction that those are classed as things which it is found impossible to represent in thought as things.[1]

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[1] Experiment would then indirectly say that space and time were *not* things.

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